ously reported. As current catheter devices were being developed and refined, traditional surgical approaches were also being altered by the development of less invasive techniques such as partial sternotomies and much smaller skin incisions. Berger and colleagues have evaluated a consecutive series of 102 patients who underwent ASD closure with surgery (n = 61) or an Amplatzer device (n = 61) during a 1-year interval beginning May 1997. Their series begins with the first patient to undergo device closure in their institution. Although this evaluation was prospective, the patients were not randomized. The patients undergoing surgery were older and had larger defects and larger shunts. In fact, the surgical series essentially consisted of those patients in whom device closure was not possible. In addition, the median age of the patients in both groups was much older than that of the usual patient currently undergoing ASD closure. The ASD closure rate was 98% in each group, and there were no deaths. Two patients undergoing surgical treatment had significant complications, and in 1 patient the Amplatzer device embolized, requiring surgical retrieval. Length of stay was shorter in the patients receiving the Amplatzer device (3 days) than in those treated surgically (8 days). On the basis of the similar outcomes, the absence of need for blood products, and the decreased length of stay, the authors conclude that the Amplatzer device is preferable to surgical closure of ASDs.

Despite the fact that the series are concurrent and from the same institution, the report is flawed by the fact that the 2 groups are not comparable, as is pointed out by the authors. True randomization into comparable series could have been achieved by including only those patients who were suitable for either surgical or device closure, and the results would have been more meaningful. Most patients undergoing surgical closure of ASD now are discharged in 3 days or less, and it is unfair to use decreased length of stay in this series as a reason for the superiority of the Amplatzer device. However, in our institution, as noted below, most patients receiving the device are discharged in 24 hours. The authors have fairly presented one of the major complications of device closure, that is, embolization. Although uncommon, it is potentially the cause of a very unsatisfactory outcome (stroke or death) in a patient with a relatively benign defect. Despite these criticisms, the authors have indeed demonstrated the ability to successfully close secundum ASDs in about half of the patients with this problem.

At the Medical University of South Carolina over the past 23 months, 60 patients (aged 2-75 years) have undergone successful device closure of ASDs, and 97% were discharged in less than 24 hours (W. Radtke, personal communication). No significant complications have occurred. During the same interval, 16 patients were evaluated by echocardiography (without the need for catheterization, as in the series reported by Berger and associates) and were believed to be unsuitable for device closure. Because catheter device closure is much less invasive, this approach probably will become increasingly popular with pediatric cardiologists, patients, and families. With further experience and device evolution, this technique will become applicable in a larger proportion of patients with these defects than the 50% reported here. It is likely, however, that a significant subset will continue to have defects unsuitable for device closure; thus surgical intervention will still be required in that group. Surgical closure should continue to provide excellent results as in the past, but less invasive techniques offer the possibility of decreasing morbidity.

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Commentary

It has been more than 20 years since the first report of successful transcatheter device closure of atrial septal defects (ASDs).[1] In the past decade, at least 6 different devices have been in widespread clinical trials; several are now approved for use in many countries. Past reports have compared catheter closure of ASDs with historical surgical series. Berger and associates are to be commended, because theirs is the first study in which an attempt has been made to compare concurrent results of surgical and device closure of ASDs. Surgery and device closure were each performed on 61 patients. Complications and efficacy of the 2 procedures were similar at hospital discharge except for a higher incidence of postprocedure atrial arrhythmias in the surgical group.

The limitations of this study highlight the difficulties in performing such a comparison at 1 center. The surgical group was composed entirely of patients who were deemed inappropriate for the Amplatzer device, in most cases because their ASDs were too large or had an inadequate rim of septum to secure the device. Over two thirds of the patients who ultimately underwent surgical closure had previously gone to the catheterization laboratory with the intent of device closure. Not surprisingly, patients who underwent surgery were older, had larger defects, and had bigger shunts than those who underwent device closure. The differences between the 2 treatment groups are of more than academic importance. As the authors note, they may be

implicated as a cause for the higher incidence of atrial flutter and fibrillation after surgery. Even accepting the fact that there were major differences in patient population between the arms of this study, it seems very unlikely that surgery in a comparable group would have been associated with significantly fewer complications than device closure.

Although the limited follow-up of most reports may make it a bit overly enthusiastic to conclude that device closure is now the preferred method of ASD repair, it is reasonable and appropriate to conclude that device closure is a viable and acceptable means of closing appropriately selected ASDs. The fact that such a statement can be made is a testament to the remarkable advances made in the design and application of ASD closure devices over the past 10 years. Improvements that current devices incorporate include systems deliverable through sheaths small enough for very small children, materials increasingly resistant to fatigue, and self-centering characteristics that have reduced residual leaks after device closure. The diversity of designs should permit an increasing percentage of secundum defects to be successfully closed.

We can anticipate continued refinement of ASD closure devices in the near future. Along with improvements in technology, the field requires parallel improvements in our ability to select patients appropriate for device closure, minimizing the number who undergo catheterization unnecessarily. The thoughtful evaluation of these procedures demands carefully constructed prospective comparisons of catheter and surgical ASD closure. This is particularly true in light of recent changes in the surgical approach to ASD closure. Such studies cannot be accomplished by a single center and will be costly. Because they should not be restricted to a single type of device, industry will not support them. Thus such studies are likely to be conducted only with governmental funding.

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